FINAL REPORT

19980143

WEATHER MONITORING SYSTEMS FOR DISEASE FORECASTING

March 2002
Funded by the Agri-Food Innovation Fund

Prepared by: District Number 31 ADD Board

Canada

Saskatchewan

19980143

Final Report -Weather Monitoring Systems For Disease Control, March 25, 2002

Final report prepared by Larry Lee, extension Agrologist Nipawin
Phone: (306) 862- 1793
E-Mail: llee@agr.gov.sk.ca

Project Number: 9800143

Summary:
Project Objectives
(1) To add two new weather monitoring sites in north east seed potato growers fields, to compliment the weather monitoring and disease forecasting system already established in the province through AFIF funding received by the Saskatchewan Seed Potato Growers Association in 1998.
(2) To utilize the environmental data collected by the monitoring to produce timely and more accurate disease prediction information.
(3) To provide field monitoring service so disease control recommendations produced through the weather monitoring equipment and computer program can be correlated to what is actually occurring for disease development in the field.
(4) To make the resulting disease prediction information and appropriate management information available to Northeast Saskatchewan seed potato producers. Information will be available via a toll free line and phone message system in Regina and via the Saskatchewan Agriculture & Food web site.

Technical Report:
Background and Objectives – The Saskatchewan Seed Potato Growers established a series of eleven weather monitoring stations in the province in 1998, through funding provided by the Agri-Food Innovation Fund. There were two of the sites established in the north east region. The data collected by these weather monitoring stations was used to generate forecasts for the potential of late blight disease. To make the weather monitoring network more complete, the District 31 ADD Board applied for funding to add two more sites into the provincial monitoring network. One of the sites that we had in our district was moved to Tisdale in 1999. The other set of equipment was moved into the Quill Lake Region to provide data for growers in that area. The two new sets of weather monitoring equipment purchased in 1999 by the District 31 ADD Board through this AFIF project were located on seed potato grower's farms in the Nipawin District (at Nipawin and Carrot River). The data from all the weather monitoring sites is fed into the central provincial computer located at the Saskatchewan Agriculture & Food office in Regina. The central computer makes weekly forecasts for the potential of disease development based on weather conditions in each area of the province where the weather monitoring equipment is located. The forecasts are available to farmers through maps generated on the Saskatchewan Agriculture & Food website or producers were able to receive the information by phoning the toll free Late Blight Hotline

1-888-419-SPUD (7783).

Project Activities and Achievements:

The equipment for the two new weather-monitoring stations was purchased in January 1999 from Campbell Scientific (Canada) Corporation, Edmonton, Alberta. The equipment was installed in the field in June 1999 and in June 2000. One of the sites was located at Nipawin and the other site was located at Carrot River. These two sites were tied into the provincial weather monitoring system and weather data collected by the two sites in our district was fed into the central computer in Regina. Andrew Sullivan, Vegetable Specialist, Saskatchewan Agriculture & Food, Regina operated the central computer program and generated the data to be used in the forecast maps, which are listed on the Saskatchewan Agriculture & Food web site. A copy of the report from the Saskatchewan Agriculture & Food web site for 2000 is shown below along with the Late Blight Forecast Map for Saskatchewan and two of the Late Blight Updates faxed out to growers by the Saskatchewan Seed Potato Growers Association. These are examples of the data generated by the program that were of benefit to growers in making decisions on fungicide application for disease control.

Potato Late Blight Forecasting in Saskatchewan

Last Updated: July, 2000

Due to a couple technical difficulties, maps for the Late Blight Forecasting System will not be available until Monday, July 17. There have been no reported cases of Late Blight in either Saskatchewan or in any neighbouring provinces to date this year. However current weather patterns are ideal for the spread of Late Blight, should it be present. All growers should have at least one spray on by this time and be following spray intervals of 7 to 9 days. It is critical to get an application on before the plants touch in the row so that there will be residue on the lower leaves later in the season when it is difficult to penetrate into the lower canopy. Protectant fungicides such as Bravo 500, Manzate 200, Polyram DF and Dithane DG are all excellent products that are registered for use on potatoes. If you have any questions, feel free to contact Andrew Sullivan - Vegetable Specialist at 787-2755 at any time.

Monitoring of weather conditions and forecasting the risk of late blight occurrence is being conducted by Saskatchewan Agriculture and Food, the Saskatchewan Seed Potato Growers Association (SSPGA) and the Saskatchewan Potato Utility Development Corporation (SPUDCO). The forecast program utilizes weather data collected by 12 weather stations established in Saskatchewan potato fields.

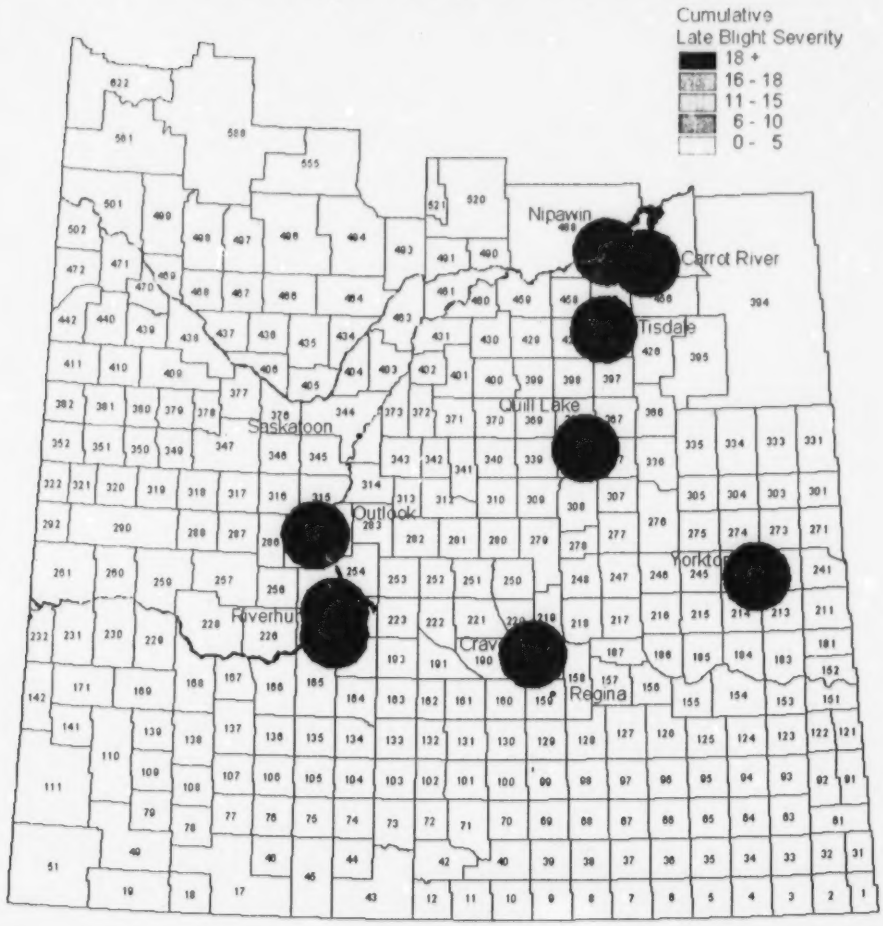
These stations monitor temperature, rainfall and relative humidity, the data is entered into a central computer at Saskatchewan Agriculture and Food's Crop

Protection Laboratory, and a risk assessment program forecasts the possibility of an outbreak of late blight. The program generates Late Blight Severity values that are an indication of the favour ability of weather conditions for the occurrence and spread of late blight. These weather conditions for late blight determine the spray interval. When conditions are highly favourable for late blight a 5-day spray interval is recommended. If conditions are not favourable, the spray interval can be extended to 10 days. Regardless, if late blight is present in a field or in the immediate area then the spray interval should not exceed 7 days.

The severity value threshold is within a range of 15 - 18. After this threshold has been reached late blight is likely to occur within the next 7 to 10 days. The map indicates the cumulative Late Blight Severity values to date. The higher the severity value the greater the likelihood of finding late blight in the area.

Late Blight Hotline: 1 - 888 - 419 - SPUD (7783)

Potato Late Blight Conditions for September 13, 2000



Prepared By:	Geomatics Unit, Statistics Branch
Data Source:	Sustainable Production, SAF
Date:	September 13, 2000

Saskatchewan Agriculture and Food

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SASKATCHEWAN SEED POTATO GROWERS ASSOCIATION

131 - 1222 Alberta Avenue
Saskatoon, Saskatchewan
Canada S7K 1R4

Phone: 306-931-7892
Fax: 306-931-2839
e-mail: sspga@sk.sympatico.ca

Re: Late Blight Update to July 21, 2000

BLIGHT HOTLINE No.: 1-877-906-6611

TO: All Seed Potato Growers **DATE:** July 21, 2000

FROM: Dianne Moebis, SSPGA Manager

We have been experiencing some difficulties with the Blight Hotline. I think we have now fixed the problem so that when you call, you actually get the hotline and not the office fax.

THERE HAVE BEEN NO INCIDENCES OF BLIGHT REPORTED IN SASKATCHEWAN TO DATE. Blight is, however, has been reported in the Holland, Manitoba area and North Dakota. Please ensure a spray program is in place.

The following severity values are effective as at July 21, 2000

Station	Value
Yorkton	Not Reporting
Craven/Lumsden Valley	11
Riverhurst South	15
Riverhurst North	16
Outlook South (SIDC)	22
Outlook North (Massey)	27
Outlook East (Redlick)	20
Saskatoon	Not Reporting
Quill Lake	29
Tisdale	16
Nipawin	43
Carrot River	25

When severity values reach 18, environmental conditions are right for late blight to develop within 7 - 14 days. Ensure that you have a scheduled fungicide program in place. A 7 - 10 day cycle is recommended.

This project is supported by:

**Agri-Food Innovation Fund Sask Ag & Food Rohm and Haas Canada Inc.
Nipawin AD Board #31 University of Saskatchewan Sask Valley Potato Corp.**

**DON'T FORGET *SIDC-SSPGA POTATO DAYS* & SEMI-ANNUAL MEETING
AUGUST 8, 2000 at CSIDC FARM, OUTLOOK**

SASKATCHEWAN SEED POTATO GROWERS ASSOCIATION

131 - 1222 Alberta Avenue
Saskatoon, Saskatchewan
Canada S7K 1R4

Phone: 306-931-7892
Fax: 306-931-2839
e-mail: sspga@sk.sympatico.ca

Re: Late Blight Update to July 28, 2000

BLIGHT HOTLINE No.: 1-877-906-6611

TO: All Seed Potato Growers DATE: July 28, 2000

FROM: Dianne Moebis, SSPGA Manager

THERE IS ONE CONFIRMED INSTANCE OF LATE BLIGHT IN THE PROVINCE.

Blight is also being reported in the Selkirk area of Manitoba and is suspected in Carberry. Please ensure a spray program is in place.

The following severity values are effective as at July 28, 2000:

Station	Value	Station	Value
Riverhurst South	26	Yorkton	Not Reporting
Riverhurst North	30	Saskatoon	Not Reporting
Outlook South	39	Quill Lake	44
Outlook North	39	Tisdale	16 (being checked)
Outlook East	30	Nipawin	57
		Carrot River	34

When severity values reach 18, environmental conditions are right for late blight to develop within 7 - 14 days. Ensure that you have a scheduled fungicide program in place. A seven day schedule is recommended. Those who may be looking to use Tattoo C, Acrobat MZ or Curzate and do not yet have supplies should check with their dealers immediately. Reports are that they are becoming difficult to obtain.

Andrew Sullivan would like to thank all those who are sending in their aphid pan traps. He is seeing a higher than expected number of aphids in the traps. This is confirming visual sightings in the fields in some areas of province. The lab is in the process of identifying the types. There will likely be an information session on aphids at our upcoming Field Day.

This is the last time I will be faxing out values UNLESS there is other information to provide. Please call the BLIGHT HOTLINE for updates.

This project is supported by: **Saskatchewan Seed Potato Growers Association, Agri-Food Innovation Fund, Sask Ag & Food, Rohm and Haas Canada Inc., District 31 AD Board (Nipawin), University of Saskatchewan and Sask Valley Potato Corp.**

During the summer of 1999, Kari McCaffery, the horticulture technician for the program monitored seed potato fields for growers. During the summer of 2000, the summer horticulture technician was Ryan Boughen. The summer technician in 2001 was Greg Youzwa. They checked fields for disease symptoms and insects such as aphids that could also spread disease. During the summer of 2000 and 2001, the technician's set up aphid traps supplied by Andrew Sullivan, Vegetable Specialist, Saskatchewan Agriculture & Food to get an accurate measure of aphid numbers and species of aphids in the fields. This data could be used to determine if aphid control programs were necessary to prevent possible disease development that can be spread by aphids. The summer technicians also checked the weather monitoring equipment to see that it was operating correctly. The summer students also collected plant samples with possible disease symptoms and submitted these to Jill Thompson, Disease Specialist, Crop Science Department, University of Saskatchewan, Saskatoon. Analysis was done on these plant disease samples to determine what disease was present. Disease control data could then be passed on to growers through the summer students.

The District 31 ADD Board also worked with Saskatchewan Seed Potato Growers and Agriculture & Agri-Food Canada on a special project in 1999 and 2000. This project was implemented to provide data on Potato Leaf Roll Virus Disease, so seed potato growers in the province could obtain certification as being disease free to allow export markets to be established in Europe and Asia. Through this program our summer students collected plant leaflet samples and these were sent to the lab in the Maritimes for disease testing and certification as disease free. This could open up additional markets for seed growers if our province can be certified as disease free for Leaf Roll Virus for a two year period.

Results and Conclusions:
Through this project seed potato growers were able to obtain data on the potential for disease development and this data could then be used to make decisions on how often crops had to be sprayed to prevent disease development in the field. Seed potato growers in our region were able to maintain a disease free status in their fields in 1999, 2000 and 2001. When the ratings were high on the Late Blight Severity maps generated by the weather monitoring project it showed producers that they had to maintain a spray program throughout the growing season. During dry periods such as those experienced in 2001, it allowed dry land producers to reduce the number of fungicide applications. Saskatchewan now has one of the best disease records of anywhere in North America. This ahs opened up new markets for seed potatoes into Prince Edward Island, Manitoba, USA and Mexico. Seed potato growers have been able to sell their crop early in the year and they are also getting better prices for their product.

Personnel:

Individuals who worked on this project included:
Kari McCafery, Horticulture Technician, 1999
Amanda Nilson, Horticulture Technician, 1999
Ryan Boughen, Horticulture Technician, 2000
Jami McBain, Horticulture Technician, 2000.
Greg Youzwa, Horticulture Technician, 2001

Other support staff involved in the project included the following:
Larry Lee, Extension Agrologist, Saskatchewan Agriculture & Food, Nipawin
Andrew Sullivan, Vegetable Specialist, Saskatchewan Agriculture & Food, Regina
Jill Thompson, Disease Specialist, University of Saskatchewan, Saskatoon
Doug Waterer, Vegetable Specialist, University of Saskatchewan, Saskatoon.

Equipment:

Quantity	Part Number	Description
2	CR10X	Measurement & Control Module w/128K Ram
2	BP 12PS	Rechargeable Battery (12V)
2	CH12R	Power Supply Regulator
2	ENC12/14	Fiberglass Enclosure
2	MSX20	Solar Panels 20 watt 12 volt
2	COM100	Motorola Cellular Connection Transceiver
2	CELL ANTM	Cellular Telephone Omnidirectional Antenna
2	COM 200	Telephone Modem – 9600 Baud
2	CM10	Tripod and Grounding Kit
2	CS500-U	Relative Humidity & Air Temperature Probe
2	41301-5	RM Young Radiation Shield
2	TE525M	Texas Electronics Tipping Bucket Metric Rain Gauge
2	237	Wetness Sensing Grid
2	CS615-L	Water Content Reflectometer
50 ft	L7359	Wire Cable Multiconductor

All of this equipment was purchased from Campbell Scientific (Canada) Corporation, Edmonton Alberta.

Innovation Fund Acknowledgment:

The Agr-Food Innovation Fund logo was used on the Saskatchewan Agriculture & Food website map that was generated for Late Blight forecasting. The project

funding was also listed on the Late Blight Forecast Updates that were faxed out to growers by the Saskatchewan Seed Potato Growers Association.

Expense Statements:

1998 – 1999	
Weather Monitoring Equipment	$18,159.38
1999 -2000	
Salaries – Technical	$10,500.00
Technician Travel	2,010.00
Telephone Service	300.00
2000 –2001	
Salaries – Technical	$9,700.00
Technician Travel	1,997.63
Telephone Service	1,213.94
2001 – 2002	
Salaries – Technical	$7,644.51
Technician Travel	2,000.00
Telephone Service	783.04
Total Project Expenses	$54, 371.30